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THE TECHNIQUE OF ARCTIC WINTER TRAVEL*

BY

V. STEFÂNSSON

It is a world rule (with its inevitable exceptions) that the members of a craft hand over to their fellow-craftsmen and successors the knowledge gained by experience and the wisdom that comes from failure. Among the conspicuous exceptions to the rule are arctic travelers. A farmer who finds an expensive fertilizer inferior to a cheaper one usually writes a letter forthwith to an agricultural journal, but a traveler who finds the sleds used by the distinguished traveler X decidedly inferior to those sold to "mushers" at Nome ordinarily refrains from saying a word about it—probably for one of three reasons: he wants to keep the knowledge for his own exclusive benefit, he is afraid of offending the distinguished X, or his publisher hints broadly that the man in the street prefers rhapsodies on polar sunsets and December auroras to technical discussions of carpentry. Accordingly a reading of modern arctic books from Parry to Peary is of disappointingly little value to one seeking light on the technique of snow and ice travel. This statement requires some qualification, however, for is there not Julius Payer with an entire chapter of "practical suggestions," and do we not have minutiæ of sled-building and sled-loading in Nansen's delightful "Farthest North"? There are suggestions, too, by Greely and by Rae, and by several others; there is much wisdom with Peary if one reads between the lines. But it is only to the man of experience that this interlineation is legible, and it is the man without experience who most needs the advice, for it has been true in the past, and will probably hold for the future, that half of the more pretentious polar expeditions are commanded by men without experience who do not suspect the trials that await them and who are so completely discredited by the failure of their first venture that they do not get a second chance to retrieve their fortunes and profit by their failure, even when they do not pay with their lives for their lack of knowledge and for their misknowledge.

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* The author wishes it stated that, when this paper was written, he had no opportunity of knowing of the publication of Peary's "The North Pole" or of consulting it with reference to the technique of arctic travel.

Attention may be called to a former contribution by the author, entitled "Suitability of Eskimo Methods of Winter Travel in Scientific Exploration," in the *Bulletin*, Vol. 40, 1908, pp. 210–213.

But evidently mere railing will do little good. A crust will do more to relieve hunger than will a pulpit discourse on loaves and fishes. The writer is unfortunately neither by years nor experience a commanding authority on even one detail of arctic procedure; his experiences should, however, be of value to those of less experience or of none; his opinions may also possibly have the good fortune to attract the eye of some well-informed dissenter who will feel called upon in consequence to expose a fallacy or two and thus break the embargo he has hitherto placed upon his wisdom.

In one field, too, the writer has experience exceeded by only a few scientific travelers or explorers of cold countries, for he has driven dog-sleds more than 5,000 miles through rough sea ice, across level coastal plains and among arctic mountains—three sets of conditions which comprehend the sum of possible arctic sledging experiences. Accordingly, if he is going to contribute an essay on the technique of arctic exploration, sleds and sled dogs are for him the self-chosen topic. Most men of experience are agreed, too, that this is a subject of the gravest import to one preparing a venture for the north; together with the allied topics of winter clothing and campbuilding we have in it the body of nine-tenths of the traveler's winter lore.

Nansen and his successors, both in point-blank statements and by the pride with which they point to the lightness of their equipment, make strength and lightness almost co-ordinate prime requisites in a good sled. From this point of view many men of experience differ and the writer would go so far as to make the paradoxical statement that an ounce of strength is worth a pound of lightness. Or, to put the same idea more sensibly and definitely: if a sled weighing 75 lbs. carrying a 600 lb. load will withstand a shock x, a sled weighing 150 lbs. carrying the same load would be by far the preferable sled if it could withstand a shock of $2x$ violence. In other words, doubling the strength of a sled, though you double its weight too, more than doubles its value for rough work. But it is easily possible to more than double the strength of a sled without doubling its weight, and this makes it imperative that a sled's strength shall be so proportioned to its load that danger of breakage will be minimized.

But frangibility of materials is not so important a factor in causing sled accidents as is intemperate loading. The gravest and most frequent mistakes of inexperienced sled travelers are those of burdening a sled beyond its reasonable capacity. A load of a thousand pounds, or of eight hundred, or even six, is so heavy that in going down over a hill or pressure ridge one man finds it impossible and two or three men difficult to control it. The result is that sooner or later the sled bunts its nose or batters its side with too much force against a snag of ice, and we have a breakdown that furnishes interesting material for a forthcoming narrative but constitutes an exceedingly disagreeable experience at the time it happens. It seems to the writer that in practice a load of four hundred or five hundred pounds is as heavy a one as should ordinarily be taken into unknown ice or among mountains, while six hundred is certainly the maximum. One sled tender at each sled can keep the sled going with speed and safety not possible if the load is too heavy.

Another consideration is that the hauling weight of a sled on the level does not increase by any means a hundred pounds for every hundred of its weight. The important thing is to shoe the sleds with material that glides easily over the snow. For all-around purposes it is doubtful if any shoeing excels steel of the greatest hardness compatible with enough flexibility to avoid snapping if the sled runner should bend under a shock. Composition metal, in which copper or nickel is the essential, has much to recommend it, providing the shoeing is at least twice as thick as any the writer has ever seen on arctic sleds, say a sixth to a fourth of an inch at least. The ordinary thin composition shoeing will not go more than two hundred or three hundred miles on salt ice before wearing through and beginning to tear off. If one has Eskimo companions, ice shoeing is perhaps best of all.

Sleds, even with runners of considerable width, will now and then encounter snow so soft that they sink to the body into it. Some attempt to minimize this difficulty by having the body of the sled high from the ground or by increasing the width of the runners. But increased height makes the sled weaker as well as heavier, while increased width of runners increases the surface friction of the sled (especially on salt ice) and makes it difficult to haul. The general plan which the writer wishes to present is this: Have the sled of the height dictated by other conditions than the possibility of deep, soft snow (say eight to twelve inches) and provide for soft snow contingencies by having the bottom of the sled body made of longitudinal slabs of smooth-planed wood bent up slightly at the front end, and have these placed under (not above, as is usual) the crossbars of the sled. Then, when the runners sink into the snow far enough the body of the sled becomes a toboggan—admittedly the ideal form of sled for soft snow. With this provision for heavy going it is safe (in fact, advisable) to make the sled runners narrow if they are shod with metal, say an inch and a quarter as against the four-inch runners of the "approved arctic sleds."

Another word as to sled shoeing: The shore whalers at Point Barrow frequently have to haul boats and other heavy loads over wet sea ice. In their experience no shoeing is so satisfactory as walrus ivory. It is soft and will not last many years on a single sled, but is both lighter-running and more durable than most of the expensive composition metal in use. 'Shoeing sleds in this fashion is one of the Eskimos' many contributions to the perfect equipment of polar explorers.

In discussing the question of sled construction it is to be said that writers have paid far more attention to it than they have to the more important one of sled dogs. Many books speak of the number of dogs on the ship's deck as if the number and not the individual qualifications of the dogs were the significant thing—as well rate the naval strength of China by the number of her junks or her present military power by her gross population. There is never a horse-dealer who would buy a car-load of horses, unseen, by the number of head, but explorers will place an order for so many dogs delivered at a certain time and place and then stake the success of the expedition on them. As a matter of fact, dogs differ more among themselves than do ordinary horses, almost as much as racehorses differ. Furthermore, deck room on board ship is limited as well as cargo capacity below; every useless dog needs room and eats food; every half-efficient dog eats as much as a sound dog of suitable training. Here, then, we have great waste to begin with; later on, when a sled party leaves the ship the poorer dogs are a grievous handicap, especially in the hands of unskilled drivers, who are often unable to tell whether a dog is really pulling or merely keeping his trace tight and shamming.

As to the type of dog to be preferred the following may be said: The writer has driven half a dozen Greenland dogs, and several dogs from Coronation Gulf, South Victoria Land, West Victoria Land, Bathurst Peninsula, the Mackenzie Delta, Flaxman Island, the Colville River and Point Barrow. These were all dogs secured from Eskimos. In addition he has experience with a dozen or so Indian dogs of his own from the Mackenzie River, and a few dogs of the type known in the central west of Canada as "huskies"—dogs from somewhere near Hudson Bay or from Labrador, which seem to be unrelated to the Eskimo dog proper. In general Eskimo dogs are to be objected to on three grounds: they are too small, they soon cease pulling if hungry, and they are liable to kill each other fighting. Their strong point is a furry coat that enables them to meet the cold well. Of several hundred dogs seen along the Mackenzie River not one in four has a suitable coat; otherwise there are many good dogs among the Dogrib, Slave and Loucheux Indians. On the whole, the best dogs known to the writer are the "huskies." They have a good coat, are large enough (they weigh up to one hundred pounds), have long legs and are therefore fast walkers; they have much stamina and do not (some of them, at least) cease pulling their best till their strength is actually gone—often till they drop and have no energy to follow the sled when the harness has been removed. This last quality is not infrequent among Indian dogs, but I have never seen it among true Eskimo dogs. There is not, however, enough difference in dogs as to geographic origin to justify an expedition taking outside dogs into any district where it can rely on getting a sufficient number of native animals.

It is seldom possible to tell a good dog from a poor one by looking at him; it is not even easy to tell a poor one after you have him hitched to a sled. You see a dog going through the full pantomime of hard work: put your hand on his trace, and he is not pulling ten pounds. That sort of dog is worth no more than his skin is for clothing; he would be expensive if presented to you and a handicap if kept or used.

But how can one avoid such animals? That depends on circumstances. If you are going into a region where you can not get native dogs, and if you are not in the characteristic American fever haste which plans an expedition during holiday week and sends it off in June, if you have the time, you can go yourself or send a man who knows, to buy dogs after testing each one. If you cannot do that. get a man you can trust (if you can get such a man), in some country where dogs are used for hauling, to buy at any necessary price the dogs known in his neighborhood (be it Julianehaab or Nome) as good dogs, not too old, and well furred. (This last is important. Dogs that do well enough at Dawson or on the lower Mackenzie may freeze to death on the coast. Anyway, a dog eats more and is in less flesh if his fur is short or thin.) But if you must buy dogs by the job lot, buy twice as many as you need and have at least one good dog man to try out the whole lot at the first opportunity. Throw out the worthless and even the poor, and grade the good ones into teams, keeping the best for the severest tasks. Do not put good and poor dogs into one team; it is not fair to make a willing dog haul fodder for a laggard team-mate.

If you have good dogs (weighing, let us say, from seventy-five to ninety pounds each), four dogs are enough for a team, and six will haul a larger load than you can expect a sled to stand or one man to take care of in rough going. Each dog should be able to handle one hundred and fifty pounds, though it is a matter of judgment in any given case whether you could not go farther and accomplish more with a smaller load.

The proper number of men on a sled trip is one man for each sled, and one besides to go ahead of the leading team to encourage the dogs on and to pick the road. It is true that every additional man cumbers the party with his food and gear, but if it be not one's object merely to spend the greatest possible number of days away from one's base of supplies, but rather to traverse the greatest distance in a given time, it will be found that, whether the distance covered during the day turns out to be two score miles or two hundred meters (but especially in the latter case), the fourth man with a three-sled party more than pays, in meters or miles, for his board and "keep."

There remains to be considered the matter of harnessing and hitching dogs to the sled. There are three general methods in use.

1. The Greenland or Eastern Eskimo method is to hitch each dog directly to the sled by an individual trace. The traces vary slightly in length, the middle dog (leader) having the longest trace. This method is open to four chief objections.

a. The dogs naturally spread in a fan formation in front of the sled; consequently only a few pull straight ahead, the others pull sideways to a greater or less extent so that (to speak a bit technically) the resultant forward tendency of the sled is at a considerable angle with the strain exerted by any of the dogs (unless it be one or two dogs in the middle of the team). In other words, a good deal of energy is wasted.

b. When the dogs come to a small cake or snag of ice they will split on it frequently, some going on one side, some on the other. This brings the sled with a bunt against the obstruction, or at least catches the traces of the dogs and makes it necessary to stop and get them on the right side of the snag.

c. When the sled stops for any reason (and sometimes even when the sled does not stop) the dogs get tangled in the traces and are often difficult to disentangle.

d. If the dogs come to a ditch-like depression or other obstruction at right angles to one's course, then all the dogs will meet the obstruction simultaneously, and the sled will probably stop. If, however, one of the other two methods mentioned below is used the rear dogs will be on good footing and hauling well, while the front dogs cross the obstruction (be it narrow, as it often is), and the front dogs will in the meantime have secured good footing before the rear dogs get to the bad place where they cannot pull. Besides, dogs side by side are likely to crowd each other where the road is bad, and this will probably start a fight.

The two main points in favor of this system of hitching are (a) that the dogs are freer to travel fast than in any other system (an advantage only when one travels over smooth ice for comparatively short distances) and (b) that the driver can detect, by the slackness of the trace, whether any dog is shirking and can whip the animal up. Those familiar with a dog's ability at bluffing discount this argument somewhat.

2. The white man's (and Indian's) method is to hitch the dogs tandem with two traces running the whole length of the team and fastened to each dog's harness on both sides just behind the collar. This method largely obviates the difficulty of having the dogs pull in other directions than straight ahead and completely obviates the splitting of a team on both sides of an obstruction. It is true, however, that dogs so hitched will not take a light sled over smooth snow nearly as fast as will the same dogs hitched in either of the other two ways. The weightier objection is this: When dogs are pulling where there is very rough ice the leading one or two members of the team may get to an elevation in front while the sled is still on an elevation behind; the result is that the pulling of the leaders lifts the rear dogs almost or quite off their feet—occasionally one sees a dog literally dangling in the air. It is clear that any upward strain on a dog lessens his pulling power by decreasing his purchase on the ground. Furthermore, in rounding a sharp corner of ice the middle and rear members of the team are often jammed against the cake of ice so they cannot pull much, while in coming down off a pressure ridge the rear dog is liable to be injured by having the sled fall on top of him.

3. The Mackenzie River and Western Eskimo method obviates most of the difficulties of both systems and is the one which the writer thinks best suited to rough ice, though he prefers the double-trace system for overland travel. The essential of this method is that there is a single long trace from the sled to the leading dog of the team. At suitable intervals back along this trace are hitched the other dogs, the rear dog say five or six feet from the sled, and the next so far ahead of him that the nose of the dog behind does not quite come to the other's tail. There is a slight difference between the Mackenzie and the Western Eskimo method, which seems to the writer to make the Mackenzie method superior. It is this:

The Western Eskimos generally hitch the dog's harness by a toggle directly to the main trace. When this is done, a dog may be lifted off his feet in rough ice (as described above for the double-trace method). The Mackenzie people get around this difficulty by attaching the rear dogs to the main trace by an individual trace of some length, say four feet for the rear dog. The farther forward in the team you go, the shorter this individual trace. This system gives the dogs almost the freedom of the Greenland method, while in rough ice one dog may be down in a hollow and the other dogs on high places, and still the dog in the hollow has his feet on the ground and is able to pull his best. The individual secondary traces give the same facility as does the fan method for detecting laggards. True, the culprit may be too far ahead in the team for the whip; however, he can be given a place farther back nearer the sled and a more willing rear dog promoted. If properly trained, dogs hitched by this method can, and do, pull as straight ahead as they would in double traces. Only the double-trace method, to be sure, makes pulling straight ahead compulsory even for untrained dogs. As for splitting on obstructions, there is little danger of that, for dogs walking one behind the other will naturally take the same side of the obstruction as does the leader. In going around a corner of ice the dogs can all take, and do take, the side of the trace away from the ice cake and thus avoid being jammed against it.

In addition, mention may be made of an Alaska method of hitching dogs in pairs along a single central trace, each pair pulling side by side like horses. After trying and seeing this method and having seen it tried—if one knows the others—one soon sees that it has most of the disadvantages of all the other three systems and has little to recommend it. That it is used at all is probably due to the conservatism of men used to driving horses in pairs.

In spite of the fact that most of the best arctic journeys have been done with dogs hitched in the Greenland or fan style, the writer thinks it certain that better results could have been gained with the Mackenzie system. There are many explorers of great experience and achievement who have never tried but one method of driving dogs; the writer has tried the above three methods and has besides spent a year or more in each of different regions that knows only one of the three ways. He feels, therefore, entitled to dissenting courteously but definitely from those who prefer the Greenland method.

Langton Bay, Arctic Ocean, December, 1910.